

TITLE: MICROBIAL REDUCTION OF NITRATE AND PRODUCTION OF NITRITE DURING CURING OF TOBACCO

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ABSTRACT: The role of bacteria in NO_3^- reduction and NO_2^- accumulation during homogenized leaf curing (HLC) and air-curing of burley tobacco was investigated. Possible ways for controlling the rate of NO_3^- reduction to NO_2^- and also further reduction of NO_2^- to N gases by physical, chemical or microbial treatment during curing was examined. The role of bacteria in NO_2^- accumulation was established in two ways: (1) by observing the effects of treatment with microbial antibiotics and (2) by determining population changes of the various types of NO_3^- reducing bacteria before, during, and after curing. Populations of NO_2^- accumulating and denitrifying bacteria were measured by a modified most probable number procedure. All samples were analyzed for NO_3^- and NO_2^- . The feasibility of inoculating leaf slurries with denitrifying bacteria to enhance the removal of NO_3^- and NO_2^- was tested. There were about 10^4 to 10^6 NO_3^- reducing bacteria per gram of green leaf. After 20 hr of incubating a slurry of green leaves, the numbers increased to greater than 10^8 bacteria per gram of green leaf. The concentration of NO_3^- decreased and NO_2^- increased during this time. When microbial antibiotics were added there was no change in NO_3^- concentration and no measurable NO_2^- in the slurry. The pH of the slurry greatly affects the amount of NO_3^- reduced and the accumulation of NO_2^- . Inoculation with denitrifying bacteria reduced the NO_3^- concentration about 90% and the NO_2^- concentration about 70%.

REVIEW: This paper describes the role of bacteria in the NO_3^- reduction and NO_2^- accumulation during homogenized leaf curing and air-curing of burley. The main purpose of this paper was to study the effect of denitrification on nitrosamine production during smoking. Described were research studies where prokaryotic antibiotics (rifampicin and streptomycin) were used to stop the denitrification process. This paper reported on a class of microorganisms which were successful in converting NO_3^- to N_2 . The authors isolated one microorganism called 59R (?) which in homogenized leaf converted NO_3^- to N_2 . Critical for these denitrifications was the pH of the solutions. Some considerable mention was given to the fact that this process was aerobic. No mention was made as to how well burley could be denitrated by this process.

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